GEOGRAPHIC SCHOOL BULLETINS

THE NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON 6, D. C.

VOL. XXXV, NO. 4, OCTOBER 22, 1956 . . . *To Know This World, Its Life*

► Deserts of the World

► Earth Satellite

► Bird Travelers Follow the Sun

► Helsinki: No. 2 of City Series

A SAHARA OASIS offers brackish water and meager shade to desert camel drivers. Like their mounts, they know how to cross wastelands where nature seems to forbid life itself

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BRUNO STEFANI

BRUNO STEFANI

PROUD CAMELS sniff Sahara air at Ghadames, Libya. Their nostrils close when sandstorms rage

Nile. The Sahara covers almost one-half of Africa. Countries all or partly within it: Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, French Equatorial and West Africa, Spanish Sahara.

The Sahara is not a uniform plain of hot, shifting sand dunes. An interior plateau of rocks and mountains rises to 11,204 feet in the Tibesti upland near the border of French Equatorial Africa and Libya. All areas get some rain, usually in sudden downpours. Sometimes light rain evaporates before reaching the ground. The core of the western Sahara and the section called the Libyan Desert are the driest. Even there oases are not uncommon. An oasis is simply a place where water is available; with water, much desert would be fertile.

Temperatures reach 120 and 130 during the day, but nights are chilly. Frost and snow fall on high areas in winter. The Sahara supports large numbers of Arabs, Moors, Berbers, Tuaregs, Bedouins, Jews, Negroes.

ARABIAN: Often considered an eastern extension of the Sahara, the Arabian Desert has more rain, more oases, and denser population. Its 1,000,000 square miles support an estimated 10,000,000 inhabitants. There is not a single true river. Countries covered all or in part by the Arabian Desert are Saudi Arabia, Yemen, Aden Protectorate, and Oman. The Rub Al Khali (the empty quarter) has the most exteme desolation in the peninsula, while west of it Yemen is the most favored part. Its mountains catch enough rain to water crops. Mocha coffee developed there. The Persian Gulf coast of the Arabian Desert is rich in oil.

SYRIAN: This northern continuation of the Arabian Desert covers about 300,000 square miles. It stretches from the Dead Sea to the Euphrates River and reaches as far north as Aleppo. Syria, Jordan, Saudi Arabia, and Iraq are the countries containing it.

CENTRAL ASIAN: Wide fingers of desert reach across Iraq, Iran, and Afghanistan to the arid plain of the Peski Kara Kum which covers nearly all Turkmen S.S.R. of the Soviet Union. This desert reaches from the Caspian Sea east to the Amu Darya (Oxus River). It covers 100,000 square miles.

Across the river the central Asian deserts march on. Peski Kyzyl Kum extends east and north to the Syr Darya and the Aral Sea. It measures about 370 by 220 miles and covers much of Uzbek S.S.R. and the southern edge of Kazakh S.S.R. Some of the most populous, productive, and historic oases in the world—Bukhara, Samarkand, and Tashkent—lie along its rivers and southern mountain valleys.

Southern Kazakhstan and northern Sinkiang hold three more *Peskis* (sands) of diminishing size which form the connecting links with the great Gobi.

UMI

DEVEREUX BUTCHER

Deserts Of The World

DESERTS are areas supporting little if any vegetation, animal life, and human population. Generally, one of two climatic factors cause them: too little rain, or too much cold. Cold deserts include the tundras of Siberia and Alaska and the frigid wastes of polar areas. The dry and hot variety, the only type popularly considered as deserts, spreads more widely over the globe. Every continent but Europe has them. Death Valley, above, ranks as the hottest spot in the United States.

But the Old World's deserts make those in America seem small. There, an almost continuous dry belt of varying width reaches more than one-third of the distance around the globe. Beginning at Africa's Atlantic coast, it extends east to the Red Sea, then gradually northeast through Asia almost to the Pacific. Several named deserts make up regional portions of this vast aridity.

SAHARA: The name of the world's largest desert means desert in Arabic. As is generally true of deserts, the Sahara's boundaries are not clearly defined, and conventional or arbitrary limits are often disputed. But the Sahara, in the broadest sense, is estimated at no less than 3,500,000 square miles. Thus it is somewhat larger than the United States. It stretches all the way across north Africa, interrupted only by occasional oases (cover) and by the green ribbon of the

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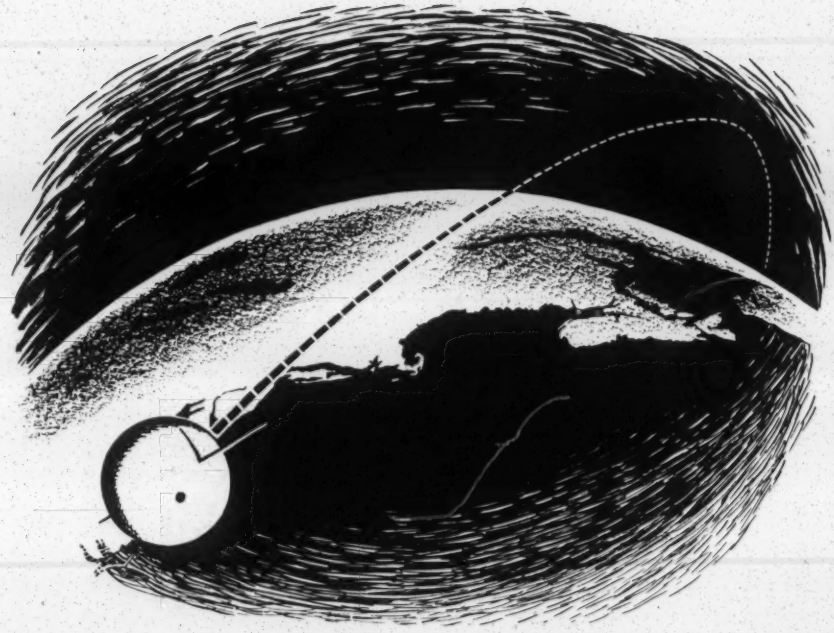


Something New Under The Sun

WITHIN two years scientists will rocket a man-made sphere, roughly the size of a basketball, to a new threshold at the thin edge of space—the biggest venture yet toward the sky's mysterious frontiers.

About 300 miles up, the new satellite will cannonball around its orbit at about five miles per second—faster than a rifle bullet—circling the earth every 90 minutes. It will become a tiny moon up where the last traces of earth's air fade off into limitless voids. The United States will build this first artificial satellite to help dramatize the International Geophysical Year (IGY), July 1, 1957 to December 31, 1958, when scientists will concentrate studies on mankind's physical environment.

Three finless high-speed rockets stacked atop one another will hoist the modest-sized moon—about 30 inches in diameter and weighing about 21½ pounds—into its orbit. The first rocket will lift the whole assembly 40 miles skyward, accelerating to about 4,000 miles an hour. The second rocket will boost the speed to about 11,000 miles an hour, will burn out and coast upward to a height of about 300 miles. There it will be jettisoned, while the third rocket pushes the satellite into its maximum speed.

To the Department of Defense falls the immense task of getting the sphere off the ground and into its orbit. This flight into space, called Project Vanguard, will blast off from Cape Canaveral, Florida.

What does science expect from such a gypsying step-child of the stars? A number of things. It should transmit the first direct information on the density of atmosphere at its altitude; and throw new light on the composition of the earth's crust—since variations in its mass may affect the orbit. It may transmit information on cosmic bombardments from outer space, along with factors bearing on the earth's weather.

Famed astrophysicist Dr. Heinz Haber says in "Space Satellites, Tools of Earth Research," an illustrated article in the April National Geographic Magazine: "The artificial satellite will not be the beginning of a new weapons development, and it will not be built because its creators are planning a trip to the moon." The immediate program looks to deeper knowledge of our own planet, he emphasizes.

UMI

ROBERT YARNALL RICHIE

ARABIA'S ANCIENT SANDS weave patterns around oil line. Pipe walker checks for leaks

GOBI: Gobi means desert in Mongolian. The Gobi proper is estimated at 300,000 square miles, the size of two Montanas. It is sparsely settled by nomad Mongols who graze cattle and sheep on the few areas of grassland. The Gobi lies about a half mile above sea level, covering parts of the Mongolian Republic, Red China's Inner Mongolia, and Manchuria.

In the widest use of the term, the Gobi stretches much farther —from the Pamirs of central Asia to the Khingan Mountains of Manchuria—2,300 miles east-west, 600 miles north-south.

TAKLA MAKAN: This completely uninhabitable basin of the Tarim River is often considered a southwest extension of the Gobi. It covers most of south Chinese Sinkiang, measures 650 by 250 miles.

In addition to the deserts of the world's great dry belt, there are many isolated examples. The Thar or Indian Desert fills 200,000 square miles along the India-Pakistan border. Australian deserts cover two-fifths of the continent and stretch from coast to coast in the west. The Kalahari sears 240,000 square miles in southern Africa while the almost rainless Namib Desert of South-West Africa reaches along the coast for 1,000 miles. The Atacama, north Chile's desert, is one of the richest (in minerals) and possibly the driest.

The "Great American Desert" of early imaginative geographers has proved to be largely semiarid, rather than arid. It now is confined to the 25,000 square miles of the Mojave Desert in southern California. Death Valley is a northern finger of the Mojave, and other dry portions of the Southwest and Mexico connect with it.

Tourism is making the small deserts of the Southwest an economic asset. Motel-lined highways cross them, and such plush resorts as Palm Springs and Las Vegas have sprung up. Even in the mighty Sahara, prosperity has come to an oasis 125 miles south of Algiers where tourists may rent camels for jaunts over the dunes.—R.G.

WALTER BOSSHARD

DESERTS LOSE heat quickly after sunset. Quilted robes keep these devout Sinkiang tribesmen warm

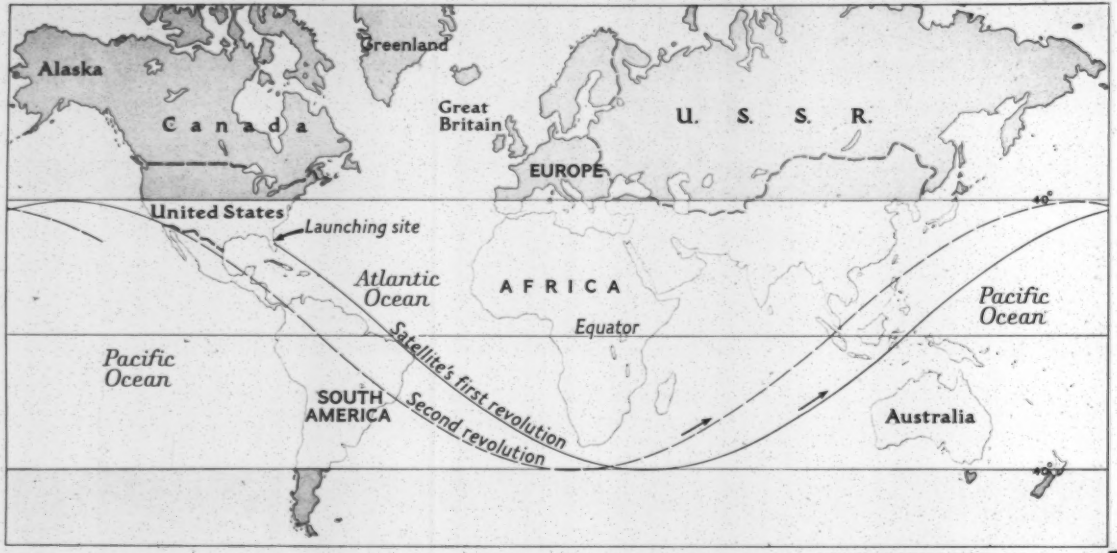
speeding orb. Gradually it would sink towards earth, meeting more drag as it descended, and falling more and more rapidly. Then air friction would heat it to incandescence. High in the sky it would vanish in a blaze.

At 200-mile elevation it might last a few weeks—at 300 miles "it would continue to circle for a much longer but undetermined time," says a satellite scientist. Present calculations of air drag and their effects on satellites are based on tentative data. Scientists expect the satellite itself to pile knowledge on the problem. Already they look to bigger satellites to come—and to consequent larger learning. Eyeing the future, Dr. Haber says:

"They will be able to carry heavier equipment into space—perhaps even television cameras with telephoto lenses that could beam their terrestrial vistas down to earth. Someday, we will be able to watch our planet in our living rooms, when the TV signals from the satellite will be hooked up to our commercial channels."

Will men someday ride a satellite? Experts agree that this is a far-distant goal, attainable only after tremendous problems have been solved. A space platform big enough to hold men would demand rockets of almost inconceivable power in order to reach its orbit. Man himself would need training and equipment to endure weightlessness in the vacuum of space.—S.H.

WILLIAM PALMSTROM, NATIONAL GEOGRAPHIC ARTIST



NATIONAL GEOGRAPHIC SOCIETY MAP

The satellite *will angle across the Equator, as the map shows, while earth turns below. Its height above the earth's surface will doubtless vary, since a perfect orbit is an almost unrealizeable mathematical ideal. Any slight error in its speed will jar the satellite from a perfect circular path into an ellipse.*

Ideal speed is 4.737 miles a second. At five miles a second, the orb would zoom 1,400 miles above earth, then dip to its starting elevation of 300 miles, then rise again.

ANDREW POGGENPOHL, NATIONAL GEOGRAPHIC STAFF

EARTH'S GRAVITY KEEPS THE MAN-MADE MOON IN ITS ORBIT . . . LIKE A BALL ON A STRING

To everyone, such a project poses questions. Why will the artificial moon remain aloft? Watch a boy whirling an object over his head by a string (right). His muscles' tension on the string balances the centrifugal force of the rotation so that the ball circles him instead of falling or flying off. Thus the satellite will stay in its orbit as long as gravity, the pull of its "string," stays in balance with centrifugal force.

Will the satellite be visible to people on earth? It may be seen in clear weather through binoculars for brief moments before dawn and after sunset. During the day, sky brightness will outshine its reflected light. Army searchlights, each packing 800,000,000 candlepower, may possibly be used to catch it in night skies.

How long will the satellite remain aloft? Were it up only 150 miles where air is denser it might last only a day or two. The drag of the atmosphere, even though slight, would be enough to slow the

a wire, "We have found the curlew's nest," reached the National Geographic Society, which aided the nesting-ground search. Nest and eggs had been located north of Mountain Village, Alaska. Strong of wing and no bigger than a pullet, the brown traveler winters on Tahiti and other South Sea islands, and flies each spring to Alaska, 5,500 miles distant, often by way of the Hawaiian Islands.

Another Alaskan visitor, the Pacific golden plover, aims for New Zealand in the fall. It flies by way of Hawaii and tiny coral islands of the Pacific, navigating so accurately that it sights them unerringly after winging 2,400 miles above trackless ocean. The Atlantic golden plover covers more than 2,500 miles between Nova Scotia and South America.

What sends such birds over incredible distances and how they find their way is still a puzzle. Do they navigate by the sun? Some scientists think that magnetic influences guide the flights; some have suggested a sixth sense—of direction.

OLIN SEWALL PETTINGILL, JR.

CHAMPION TRAVELER, the Arctic tern, hatches eggs in the tundra of the far north

Birds are powered by their food, as stored in deposits of fat just under the skin. The golden plover, for instance, uses two ounces of fat during its flight. Enormous power is generated by muscles that in proportion to the size of a bird are larger than in any land animal. Even the moth-sized ruby-throated hummingbird shows its might by flying 500 miles non-stop across the Gulf of Mexico.

Modern naturalists have found the destinations of most bird travelers. But earlier peoples tossed strange theories back and forth. An early 18th-century treatise published in London proclaimed that migratory birds spent their winters on the moon. Another old notion was that birds hibernated, relapsing into torpid states in hollow trees, caves, or in mud at the bottom of streams and ponds.—

BRISTLE-THIGHED Curlew Spans 5,500 watery miles between Tahiti and Alaska home sites. The mystery of the migrant's Alaska nesting fields unfolded to an expedition in 1948

ARTHUR A. ALLEN

NATIONAL GEOGRAPHIC SOCIETY MAP

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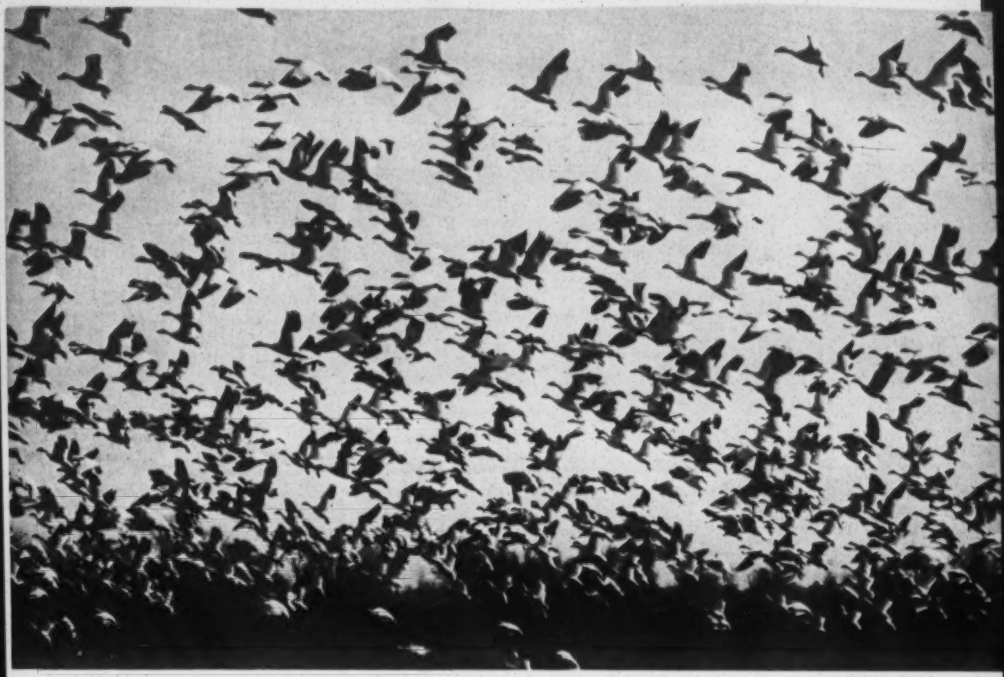


PAUL J. FAIR

Myriad Wings Beat South

WHEN winter sounds its cue, lesser snow geese like those above put on a heart-warming show. Down the Pacific coast of North America they swing in high-flying formations—a curved line, a diagonal echelon, an angular V. A vociferous chorus of honks drifts earthward. Few can resist looking up; many watch those distant winging squadrons with a tightening of the throat.

For the biannual migratory flight of birds is something with which man becomes emotionally involved. The beat of myriad wings assures him that all's right with the world, that earth is tilting properly on its axis and the new season is rolling in on schedule.

One day the conversation of sociable robins is absent from our gardens and we realize with some sadness that our friends will be gone for the season. Most robins drift off to visit southern states. Some refuse to migrate at all, merely shifting their feeding grounds to sheltered regions. On thawing days in mid winter they may show up, along with juncos and snow buntings that have migrated from far northern regions.

Some birds cover vast distances in their instinctive escape from winter. The Arctic tern leaves its summer home north of the Arctic Circle and heads for the Antarctic, some 11,000 miles away, by way of the coasts of Europe and Africa. Sometimes it strays off course. One was found on a beach near Perth, Australia. It bore a band from Sweden, 10,000 miles away.

Rollicking-voiced bobolinks spend summer along the Canadian border. But by early August they are on their way south again, tackling, in easy stages, a 6,000-mile flight to Brazil and Argentina. They cross the Caribbean Sea in a single night.

Up to June 12, 1948, only the bristle-thighed curlew among North America's 815 species of birds kept secret its nesting place and summer home. That month

CARLETON MITCHELL

"TERVETULOA SUOMEEN!" (Welcome to Finland) says a fish vendor's smile. In summer she may sell fruit, flowers

Waino understood the Finnish hunger for sunlight, that instinct to store it against drab winter. Already these dark waters where the Gulf of Finland meets the Gulf of Bothnia were chill and bleak. Another three months would find them frozen solid, the port of Helsinki closed.

The boy watched the city's pale buildings draw near, pinked by morning light. "White City of the North" people call Helsinki. Yet to Waino there was more color to Finland's largest metropolis than the phrase suggests. He loved these Saturday voyages to market, the contact with some 426,000 cordial, hard-working, literate citizens. Already, as the boat nosed into a berth beside the market place, shoppers were crowding toward the gunwale seeking fresh herring.

At other, bigger docks, vessels unloaded coal, machinery, sugar, or took on lumber and forest products. "Green Gold," Finns call their tall evergreens, the little republic's chief natural resource. And "White Coal" is the name for water power, flowing through some 65,000 lakes to turn industry's wheels and light homes even in remote regions of Lapland. With these two blessings and unsparing hard work, Finland paid off crippling reparations levied by the Soviet Union.

Helsinki's marketing is done by noon. The market square, swept clean, lies

Stockholm steamer docks near thronged market. Clustered trees shade the Esplanade

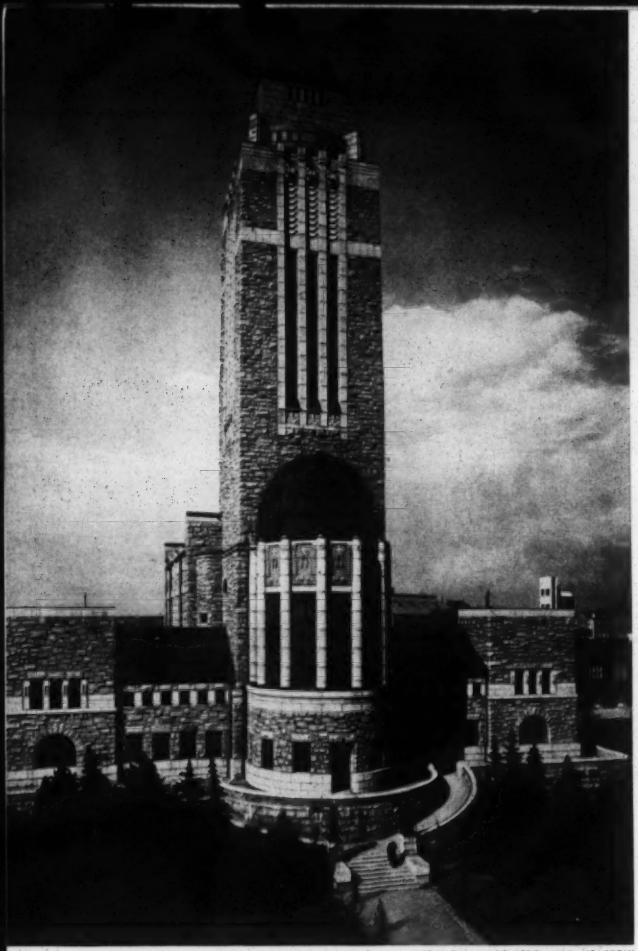
UMI

No. 2 in a series bringing to life a typical day of a distinctive city

FINNISH TOURIST ASSN., © F. RUNEBERG

Helsinki PINE-SCENTED SEAPORT

OCTOBER dawn comes late in Finland, Waino realized. He watched sunrise from his fathers' fishing boat as it slipped between islands to Helsinki's South Harbor, one of the five coves that all but surround the capital. Last summer, when days began at three in the morning, this port had been busy, choked with small boats. Finns closed shops and factories early to get outdoors.



BARONESS ALICE STAEL VON HOLSTEIN

CHURCH OF KALLIO displays soaring lines of old cathedrals and cleanness of modern style. Finland's architecture captures admiration throughout the world

empty. With a nod from his father, Waino jumped to the quay and set out to visit the Esplanade, a tree-lined mall between busy streets. Waino stared at familiar statues of Finland's great men. Soon they would wear a snowy mantle. Wooden benches were bare.

Bordering the Esplanade, office buildings overlook thronging traffic. Waino wandered pavements, peering at exclusive shops, book stores, travel agencies, cafes where the great composer, Jean Sibelius, had sipped coffee with his friends. He passed the President's Palace, Army Headquarters, the Swedish Theatre.

Son of a seine fisherman, raised in a village of unpainted wooden cottages, Waino felt awe at the sight of clean modern buildings like the red granite railroad station designed by Eliel Saarinen.

He took a street car past Great Square with its Great Church, past government offices, museums, new hotels where guests are offered saunas (Finnish steam baths), new apartments built for the 1952 Olympics. Helsinki has no particular sections, no "east (or west) end." At its extremity it simply meets the pines and spruces that smother three quarters of the republic, provide its living, and make its capital the "best smelling city in the world." In these woods that seal off Helsinki's landward side, suburbanites escape the city, living in solidly built wooden houses, tilling small plots of land. Waino considered the prospect and decided he would be, someday, a Helsinki citizen—a famous architect, perhaps, like Saarinen or the great Carl Engel of early days; a graduate of Helsinki University; a man of culture who lived in a forest suburb, kept a yacht, played tennis on weekends and swam in the olympic pool. With hard work it was possible in this democracy. Being a Finn, Waino had no fear of sweat.

Hunger called him back to the boat, cleanly swabbed down, to the welcome in his father's eye. Quietly they shoved off and set course for their distant inlet. Helsinki's gracious buildings and clean towers faded in afternoon twilight.

Soon they would be home for dinner and he would rise after it and shake hands with his parents, saying "Thanks for the food," according to Finnish custom.—E.P.